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Crossbreeding of Cattle in Sri Lanka

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CROSSBREEDING OF CATTLE IN SRI LANKA

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SUMMARY

Sri Lanka is an island in the tropics having a cattle population of about 1.7 million. In order to improve the productivity of these animals crossbreeding trials were initiated about 2 - 3 decades ago.

The indigenous cows were bred to bulls of Jersey, Friesian and Shorthorn breeds. Imported Zebu breeds such as Sindhi and Tharpakar were also bred to bulls of temperate breeds.

The article describes the findings of these experiments and their usefulness in formulating breeding policies for the different agroclimatic zones of the country.

INTRODUCTION

Sri Lanka has an area of about 65,000 square kilometres and is located about 5.5 degrees above the equator. The cattle population is about 1.7 million and the average production of an indigenous cow is about 255 kg of milk in a 280 day lactation period. A mature indigenous animal yields about 55 kg of boneless meat.

The country can be divided into several agro climatic zones (Figure 1) The ecology of these areas is shown in Table 1. The hill country is the central region having an elevation of 914 metres above sea level. The mid country is the zone bordering the hill country. The elevation in this region is from 305 - 919 metres above sea level. Imported exotic breeds such as Jersey, Friesian, Shorthorn, Ayrshire can be reared in the hill country zone while their crosses do well in the mid country.

The terrain in the coconut growing area is flat and popular varieties of pasture can be grown under coconut. Coconut palms also provide the shade from the hot sun. More than 50% of the national herd is located in the dry zone. These animals forage on natural pastures which are poor in quality. Diseases such as haemorrhagic septicaemia and foot and mouth are endemic. Farmers sell their surplus stock to butchers who transport them to principal towns where abattoirs are located.

Crossbreeding research was directed to determine feasible breeding policies for different agroclimatic zones of the country. The present article discusses the experiments carried out in some, Government cattle breeding farms.

Karagoda Uyangoda Experiment

This farm is situated in the southern wet zone of Sri Lanka. The mean annual rainfall is 2500 mm and the relative humidity is about 78%. The experimental design is shown diagrammatically in Figure 2.

FIGURE I AGROCLIMATIC ZONES OF SRI LANKA

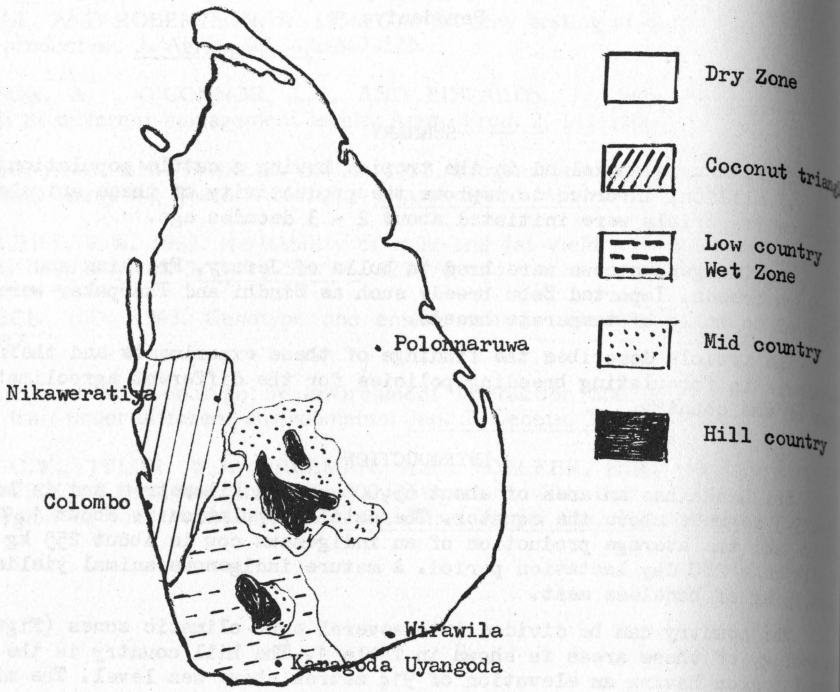

FIGURE 2. DESIGN OF EXPERIMENT AT KARAGODA-UYANGODA

STAGE I	Jersey	X Sinhala	Friesian X Sinhala	Sinhala X Sinhala
		$\downarrow$	$\downarrow$	$\downarrow$
		F_1	F_1	Sinhala
STAGE II	F_1	X F_1	F_1 X F_1	Sinhala X Sinhala
		$\downarrow$	$\downarrow$	$\downarrow$
		F_2	F_2	Sinhala
STAGE III	Jersey	X F_1	F_2 X F_2	Sinhala X Sinhala
		$\downarrow$	$\downarrow$	$\downarrow$
		B_1	F_3	Sinhala

Sinhala (indigenous) cows were bred to Jersey and Friesian bulls. F_1 generations were mated inter se to produce F_2 generations. Some Jersey x Sinhala F_1 cows were back crossed to Jersey to produce the B_1 cows. Friesian x Sinhala F_2 generation was mated inter se to produce the F_3 generation of cows.

Results obtained during a ten year period from 1970 - 79 are summarized in Table 2. It will be seen that F_1 generation of both crosses (Sinhala x Jersey and Sinhala x Friesian) showed a remarkable increase in the milk yield over the indigenous cattle. However, the yields declined in the F_2 generation. This decline continued in the F_3 generation in the Sinhala x Friesian line.

Table 1. Agroclimatic zones of Sri Lanka

Zone	Elevation	Mean monthly temperatures	Rainfall	Humidity
	Metres	Centigrade	Millimetres	Percent
Dry zone	0	23.8 - 32.2	890- 1900	75-90
Coconut triangle	0-457	23.8 - 29.4	1 900-5 080	62-80
Mid country	305-914	18.3 - 23.8	1 900-5 080	65-75
Hill country	Above 914	10.0 - 23.8	2 160-3 175	58-75

(Source Buvanendran and Mahadevan, World Animal Review (FAO) 1975

In the Sinhala x Jersey line the back crosses did not exceed the level of production of the F_1. These results indicate that hybrid vigour is responsible for a part of the enhanced yield in the F_1 generation. The superiority of the back crosses (B_1 and B_2) over the F_2 can be attributed to the additional level of Jersey blood.

Wirawila Experiment

This farm is situated in the southern province in an area that is typical of the dry zone of Sri Lanka. The Sinhala breed of cows were initially mated to Sindhi bulls to produce females with varying levels of Sindhi blood. These were then mated to either Jersey or Shorthorn sires. The results are shown in Table 3.

Table 2. Production characteristics of different breeds at Karagoda Uyangoda

Breed	305 day Milk yield	Lactation length	Calving interval
	kg	.....days.....	
Sinhala	255 (18)	262 (18)	473 (18)
Friesian x Sinhala			
F_1	1180	332	397
F_1	907	347	418
F_3	740	299	433
Jersey x Sinhala			
F_1	980	301	423
F_2	620 (10)	408 (10)	-
B_1	871	322	411
B_2	863 (04)	301 (04)	-

Figures in brackets indicate the number of observations when less than 50

Source: Buvanendran, Jalatge and Tilakaratne Unpublished data 1970 - 1979

At Wirawila no Sinhala cows were maintained but if we assume the yield to be similar to what was recorded at Karagoda Uyangoda, the production level of the Sindhi x Sinhala F_1 is close to the expected mean of the two parental breeds. This denotes a simple additive genetic effect when the two breeds (Sinhala and Sindhi) are crossed. Moreover the level of production of the back cross (B_1) shows an increase that is normally expected in upgrading to the level of Sindhi. However the introduction of temperate blood resulted in a marked improvement in the milk yield. It is important to note that Jersey crosses at Wirawila recorded a higher level of production than the Jersey crosses at Karagoda Uyangoda although the environmental factors were less favourable at Wirawila. This is probably due to the superiority of the foundation stock with higher levels of Sindhi blood in them.

It is also important to note that the Shorthorn cross was marginally superior to the Jersey cross.

Table 3. Performance of different breeds at Wirawila Farm

Breed	Age at first calving	Milk yield	Lactation length
	months	kg	days
Sindhi	-	1080	-
Sindhi x Sinhala F_1	-	773	-
Sindhi x F_1 (B_1)	-	1045	-
Jersey x Grade Sindhi	39.9	1397	297
Shorthorn x Grade Sindhi	42.6	1510	311

Source Buvanendran Jalatge and Tilakaratne unpublished data 1970-79

Polonnaruwa experiment

The Polonnaruwa Farm is located in the North Central Province of Sri Lanka. The climate is hot and humid with one main rainy season in October-December period and another rainy season with lesser impact during June-July period.

The farm maintained herds of purebred Sindhis and Tharpakars during the period 1968-78. The animals grazed on Brachiaria brizantha and B. mutica pasture and supplementary concentrate feeding was done as a matter of routine.

Experimental crossbreeding of randomly selected Sindhi cows with Jersey bulls (or A.I.) was done during this period and the results are shown in Table 4.

Table 4. Performance of different breeds at Polonnaruwa farm

Breed	Age at first calving	305 day lactation	Calving interval	Lactation length
	months	kg	.....days.....	
Sindhi	51.2	954	384	282
Jersey x Sindhi	42.9	1278	407	320
Tharpakar	-	707	-	293

The results indicate that Jersey when crossed to improved Zebu breeds such as Sindhi increases the milk yield by nearly 50% in the first generation. This improvement represents more than a four fold increase from the level of the indigenous Sinhala cow. Moreover the other characteristics such as age at first calving and calving interval

are better in the Jersey x Sindhi F_1 than in the indigenous cow.

Crossbreeding experiments with beef cattle

Sinhala cattle were bred to imported Santa Gertrudis bulls in order to determine the beef potential of the local cattle. These experiments were performed in Nikaweratiya Livestock farm situated in the North Western province of Sri Lanka. The results are shown in Table 5. The results indicate that Sinhala x Santa Gertrudis F_1 is about 20% more in live weight when compared to the Sinhala animal at the age of one year.

Table 5 Performance of different breeds at Nikaweratiya Farm

Breed	Birth Weight	6 months weight	12 months weight
	.....in kg.....		
Santa Gertrudis	31.20	151.80	222.20
Sinhala	8.45	82.80	126.30
Santa Gertrudis x Sinhala F_1	19.60	86.45	151.30

(Weights reflect the average weight for both sexes)

Source - Buvanendran, Jalatge and Tilakaratne unpublished data 1970-79

DISCUSSION

Knowledge gained by these crossbreeding experiments have helped in the formulation of a national breeding policy which can be summed up as follows.

(a) Crossbreeding of local cattle with Indian breeds such as Sindhi, Sahiwal or Tharpakar in the dry zone of Sri Lanka

(b) Introducing temperate breeds such as Jersey, Shorthorn or Friesian in other areas to get a 50% cross.

(c) In these areas maintain the 50% level using F_1 bulls in the subsequent generations.

(d) Rotate F_1 bulls in subsequent generations.

(e) Upgrading to the level of pure bred temperate only in the Hill Country zone.

(f) Breeding for beef though feasible is not done due to marketing difficulties.

REFERENCES

Buvanendran V. and Mahadevan P.(1975) Crossbreeding for milk production in in Sri Lanka. World Animal Review (FAO) No.15, 7-13